the W. M. Hawthorn site was determined to be eligible for inclusion to the National Register of Historic Places (Appendix II) and the development of a data recovery plan for further mitigation of the site became necessary.

The results of documentary historic research and artifact data gained from the Phase I and II research are integrated into this report.

RESEARCH DESIGN

Introduction

Phase I/II archaeological research at the William M. Hawthorn farmstead provided information substantial enough to determine the site eligible for inclusion on the National Register of Historic Places (O'Connor et al. 1983). The nomination concluded that "because of the separate, undisturbed areas of cultural materials dating to different periods of occupation of the site, it probably retains information concerning the variations in spatial utilization of a farmstead in the surrounds of the residence structure from the late 18th through mid-20th centuries" (Section 8, Hawthorn Site Determination of Eligibility). Thus, the major research task of the current Phase III investigation was the recovery of significant archaeological resources as per 36 CFR 800.4(c) and the Advisory Council's "Treatment of Archaeological Properties: A Handbook". In order to satisfy these requirements a data recovery plan was prepared with the cooperation of the State of Delaware, Bureau of Archaeology and Historic Preservation. The research design and methodology discussed below were derived from that plan.

Research methods developed in the data recovery plan were designed to provide a comparative data base for historic archaeological site content and site structure. It was felt that this goal could best be met employing the artifact pattern concept developed by South (1977). The application of South's concepts has been shown to be useful for data base presentation and artifact analysis by South (1977), Wise (1978), Garrow (1982), and Foss, Garrow, and Hurry (1979). The results of the present research can thus be applied to studies of rural farmstead archaeological sites that may be excavated in the future and also with previously studied archaeological sites in the Middle Atlantic Region. A special attempt was made to orient archival research to provide a coherent regional historic context within which to interpret this site and other historic archaeological sites in northern Delaware. Consideration of local and regional issues in historic archaeology was additionally facilitated by focusing on topics concerning agricultural land-use and socio-economic patterning. These study topics were developed during the background research for this project and in part follow from previously made statements on research designs in Middle Atlantic historical archaeology (H. Miller 1980). This broad-based research focus also will provide information and data compatible with DelDOT's developing historic research design (Henry 1981) and the State of Delaware Preservation Plan for Historic Resources (in preparation).

Research Designs and Methodology

The theoretical orientation of this project follows that of other problem-oriented approaches commonly applied in historic

archaeology. A final goal of research is the furnishing of independent data to test hypotheses about site formation and past cultural processes. Following methods outlined by South (1977, 1979) this research goal is most effectively accomplished when based on the quantification of empirical data and the organization of this data into standardized categories in the search for artifact patterning.

Previous research at the William M. Hawthorn site indicated that the site provided an excellent opportunity to gain a better understanding of the changing lifeways of a northern Delaware farm through time. The site was also thought to provide a unique setting to study the effects of historically documented urban and regional trends concerning agricultural land-use and socio-economic patterns on farmsteads in rural, yet not isolated, areas. Three general study topics were developed to guide the field and laboratory investigations of the present project. To accomplish these research goals, specific hypotheses and test implications were developed from the following study topics:

A) Patterns of artifact distribution and spatial utilization

B) Purchase and/or consumption habits

C) Covariation of change between topics A and B

HYPOTHESIS I: Changes in the site structure are present due to changing spatial utilization and/or function at the site.

Based on work by South (1979) it can also be expected that changing site function of the Hawthorn farmstead through time would have produced a site structure consisting of different associations of the varied groups of artifacts, structural

remains, features, and strata which form the archaeological record. This study of site content can be focused on different distributions through time of varied classes of artifacts such as ceramic and glass refuse, agricultural-related refuse, and subsistence refuse. The artifact pattern concept states that different artifact category percentages should be expected in areas of specific types of artifact disposal. An area can thus be characterized as having been an area of kitchen refuse deposition rather than an area with a combination of deposits related to demolition or repair activities. The presence of significantly different artifact patterns is assumed to be attributed to different discard mechanisms. Indeed, South (1979:221) states that "spatial patterns can focus on one artifact type or class to the exclusion of other data, and such patterns are a basic part of site structure." Similarly, artificial changes in site landscape may have been accomplished through the activities as the farmstead changed (Handsman 1981).

In order to test this hypothesis, a major research task was to obtain a representative sampling of artifacts from various sections of the site and to further investigate the spatially distinct concentrations of late eighteenth and early nineteenth century artifacts. A sample of varied site areas such as front yard and back yard was obtained using stratified sampling techniques. These samples consisted of a series of test units (measured excavation units or postholer tests, depending on the depth and stratigraphy of the deposits) placed at regular intervals in transects across the known site area within special site areas. Information on architectural remains as well as

fence lines and wall lines was also obtained. When any such remnants were encountered they were delimited and excavated to recover artifacts that could provide data on their age and function.

All excavation units were excavated in natural levels until culturally sterile, undisturbed soils were encountered. All soil was sifted through 3/8 inch wire mesh screen. Profiles of all test units were drawn and described using both texture and Munsell color descriptions. Photographs were taken of structural features, test units, and the natural setting of the project area.

Cataloging and analysis of the artifacts from the excavations focused primarily on the description of form and function. This artifact analysis was designed to provide data to test Hypothesis I. The determination of attributes such as material and decorative motif allowed a more precise classification into artifact types. A full discussion of these methods can be found in South (1977, 1979). Diagnostic artifacts, South's Mean Ceramic Date Formula, and an inverse variance mean ceramic date formula (Kalb et al. 1982:10), were used to define chronological controls within the spatial analysis. The inverse variance formulae takes into account the longer periods of production which would make this mean ceramic date (MCD) more true to life and more accurate. An artifact pattern analysis was carried out based on Garrow's (1982) adaptation of South's analytical methods. The distributions/associations of varied types of artifact classes

were also mapped and plotted. A series of maps were produced to show the presence or absence of changes in the spatial distribution of artifact deposition.

HYPOTHESIS II: Changes in the presence or absence, and frequencies of certain artifact groups or artifact classes should be related to changes and/or stability in the purchase and consumption habits of the site's occupants through time.

It is probable that regional and local socio-economic changes had affected the income of the site's inhabitants and concommitant their purchase and consumption habits. An assumption was maintained that these changes were the result of a change from a colonial, subsistence-oriented agricultural economy to that of a broader-based market economy which took hold some time in the nineteenth century. A survey of agricultural economic histories by Bidwell and Falconer (1941), Lemon and Nash (1968), Lemon (1972), and Ball (1976) of southeastern Pennsylvania and northern Delaware highlights the conflicting conclusions concerning the timing and extent of these socio-economic changes when viewed in the context of the local agricultural economy. Presently unknown are the specific effects on local farm economies of events that occurred as part of the Industrial Revolution such as the development of improved transportation networks, increased population densities, and settlement pattern shifts. Archival research was carried out in order to provide both subjective and analytical data to assess the covariation between these historically documented events and the site function and economic characteristics of its occupants through time. Archaeological analysis focused on artifact characteristics, and feature frequency and location as subjective

indicators of economic scaling. While proposed in the original data recovery plan, the use of G. Miller's (1980) economic scaling model for the nineteenth century was not used as the sample of excavated artifacts was found to be inadequate for this type of analysis.

In the northern Delaware area, local historical (Hoffecker 1974) and archaeological studies (Thomas et al. 1981; Cunningham et al. 1984 and Klein and Garrow (Eds.) 1984) of Wilmington, Delaware (less than fifteen miles from the William M. Hawthorn site) indicate an emerging transportation and commercial center through the late eighteenth and nineteenth centuries. Economic-historical studies of the relationships of Philadelphia to its hinterland indicate the long-term influence of that city on the agrarian economy of the northern Middle Atlantic States. Previous research also indicates that in both Wilmington and Philadelphia, industrialization produced significant changes in residence patterns and complex alterations in land-use. The effects of these phenomena on a farmstead in a rural, but not isolated, setting were analyzed.

The testing of Hypothesis II assessed the effects of industrialization, expanding markets, and improved transportation networks on rural farm economies and economic status, as exemplified by the William M. Hawthorn farmstead. Both archival and archaeological research were used to analyze the economic status of the inhabitants through time and the impact of larger economic phenomena on the farmstead. The original archival research involved in determining the

eligibility of the site for the National Register of Historic Places had suggested that, on the basis of the size of the farmstead and on tax assessments, the occupants of the Hawthorn site during the mid-to-late nineteenth century were in the middle income range of the population and that little change could be seen through time in their economic status. However, the initial research did not examine the late eighteenth and early nineteenth century's economic characteristics of the site's inhabitants and did not include a consideration of regional and local economic trends. A lack of an existing basis for comparison to other rural farm economies in northern Delaware made it necessary to undertake archival research to document both the comparative backdrops of regional and local agricultural economies, and the general bio-social environment against which the Hawthorn site could be analyzed.

To provide this historical context, research was focused on both primary and secondary reference sources. Primary sources included property deed records, population and agricultural censuses of the United States, tax assessments of White Clay Creek Hundred, and New Castle County Orphans Court and Probate Records. Additional information was gained from the past owner and local informants familiar with the farmstead. Secondary sources utilized included state and local histories, regional economic studies, agricultural histories, and eighteenth and nineteenth century travellers' accounts.

Based on successful documentary studies of socio-economic status by Main (1973) and Jones (1980) employing probate records, similar techniques were utilized using the available inventories

of the occupants of the Hawthorn site. To allow for a more detailed socio-economic ranking within the local economy - here defined as White Clay Creek Hundred - a research technique was employed comparing the rate, over a period of 127 years, of the tax assessments of the occupants of the Hawthorn site to all other taxables in White Clay Creek Hundred. Further, individual comparisons were made between the occupants of the Robert Ferguson tenant farm site (Coleman et al. 1983) and the William M. Hawthorn site. These comparisons were based on probate inventories, agricultural censuses, and tax assessments.

Archaeological research also consisted of an artifact analysis to identify artifact types indicative of changing primary trade networks. The point of manufacture was determined mainly through the use of makers' marks on ceramics and glass. The evidence for participation in market economies that cover wider regions was determined in the archaeological record as signified by the proliferation of diagnostic ceramics, glasswares, agricultural tools, and household goods.

Artifacts were processed and conserved in accordance with the State of Delaware Bureau of Archaeology and Historic Preservation standards and were placed on repository at the Island Field Museum, South Bowers Beach, Delaware (the official State repository) along with field notes, maps, and all excavation records. Copies of the report were distributed to the local archaeological community, libraries, and schools, and additional copies are on file at the Delaware Department of Transportation, the Island Field Museum, and the Bureau of

Archaeology and Historic Preservation.

REGIONAL CULTURE HISTORY

The 17th Century

The first historic settlement in what is now Delaware was established by the Dutch West India Company in 1630 when a whaling station was established near the present town of Lewes. However, this post was destroyed by Indians in 1631 and no settlement in that area was attempted again until 1659. A Swedish colony was established in 1638 at Fort Christiana, near the present site of Wilmington, by the New Sweden Company. Although the land was claimed by the Dutch, it was little used and unsettled when the Swedes arrived. By 1654 a small village, Christianahamm, existed behind the fort, and approximately 400 Swedish, Finnish, and Dutch settlers resided in the area.

In 1655, the uneasy coexistence between the Swedes and Dutch was abruptly ended when the Dutch seized control of New Sweden. Dutch Fort Casimir, established in 1651, and the town of New Amstel (modern New Castle) became the economic and commercial center for the lower Delaware Valley. Ownership of the Delaware region changed hands again in 1664, when the English gained control of all Dutch possessions in the New World. In 1682 the granting of proprietary rights to William Penn and his representatives by the Duke of York essentially gave economic and political control of the Delaware region to Philadelphia, the new seat of government (Munroe 1978).

The settlement pattern for this early period was one of dispersed farmsteads located along the Delaware and its tributaries, such as the Christiana, Appoquinimink, Brandywine,